Offshore Training Platform (OTP)

Proposal

for

Concept Development

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December 2000

Outline

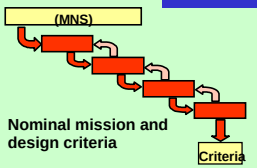
- **Proposal Overview**
- **OTP Background**
  - ***Requirements***
  - ***Candidate Systems***
  - ***Example OTP Issues***
- **Proposed OTP Program**
  - ***Phase Tasks, Resources, Schedule***
  - ***Benefits***
  - ***Summary***

Proposal Overview

- **Objective**
  - ***Establish feasible concepts and procurement cost of Offshore Training Platform***
    - **Field carrier landing practice**
    - **No full stop/arrested landings or take-offs**
- **Deliverables**
  - ***Requirements definition***
  - ***Analysis of Alternatives for Downselect, including***
    - **Operational Availability/Downtime**
    - **Acquisition costs**
    - **Life cycle costs**
  - ***Preliminary Design and Model Scale Tests of Downselected System***
- **Performers: industry and government**

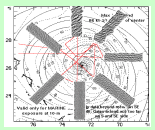
Background

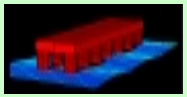
MOB Technology

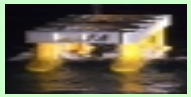


Nominal mission and design criteria

Draft design and classification process

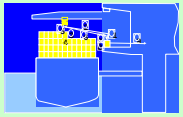




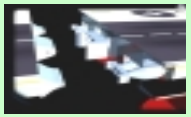


Next generation hydrodynamic simulation tools

Four platform preliminary designs



Constructability and Operational performance evaluation tools



Key components (connectors, dynamic positioning)

Draft OTP Requirements*

- **Runway**
  - *Nominal: 1000-1500 feet long by 150 feet wide*
  - *Height: 60 - 90 feet above sea level*
- **Site**
  - *"Ideally" off the coast of the Virginia Capes, or within protected waters inside the NC outer banks/Chesapeake Bay*
  - *60 - 150 feet of water*
- **Performance**
  - *Availability ≥ land-based out lying field*
  - *Deck pitch and roll ≤ CV(N)*
  - *Remain predominately at sea, throughout a life cycle of 50 years*

* COMNAVAIRLANT MNS- NOV 2000

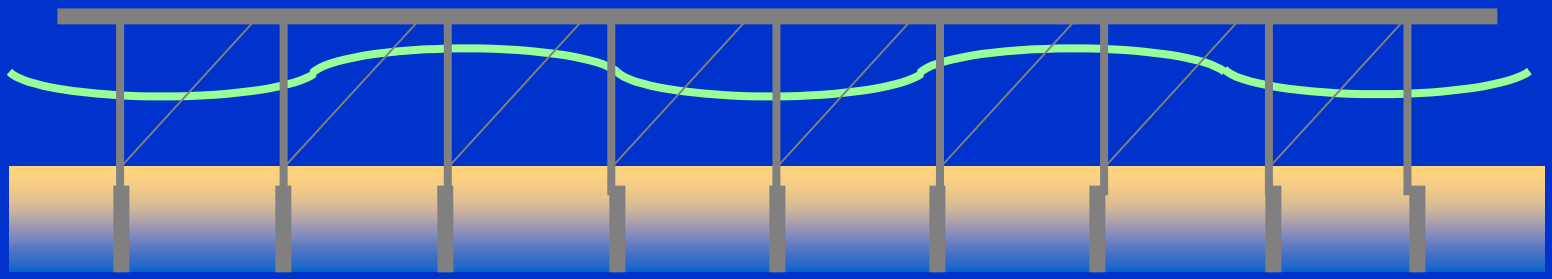
Major OTP Components

- Platform/Runway
- Stationkeeping System
- Outfitting

OTP Platform Candidates

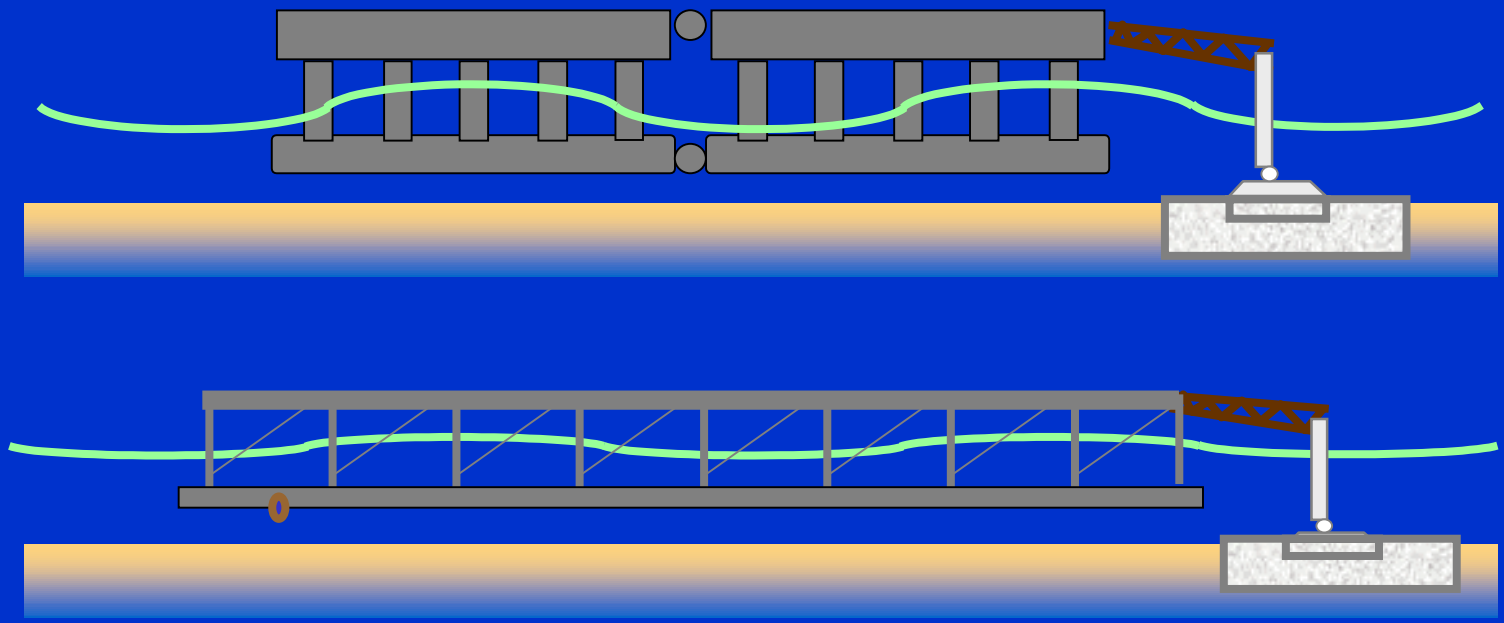
- **Pile-supported structure**
  - ***Single runway***
  - ***Oblique runways***
- **Semisubmersible**
  - ***Single hull (new construction)***
  - ***Multiple connected hulls (new or excess hulls)***
- **Barge**
  - ***MegaFloat***
  - ***Lay barge (excess)***
  - ***New construction***
- **Ship hull**
  - ***CV (mothballed)***
  - ***Single hull tanker (excess)***
  - ***New construction***

Pile-supported OTP



- No operational runway dynamics
- Acceptable Ao may require dual/oblique runways
- Water depth limited
- High cost if used in exposed area

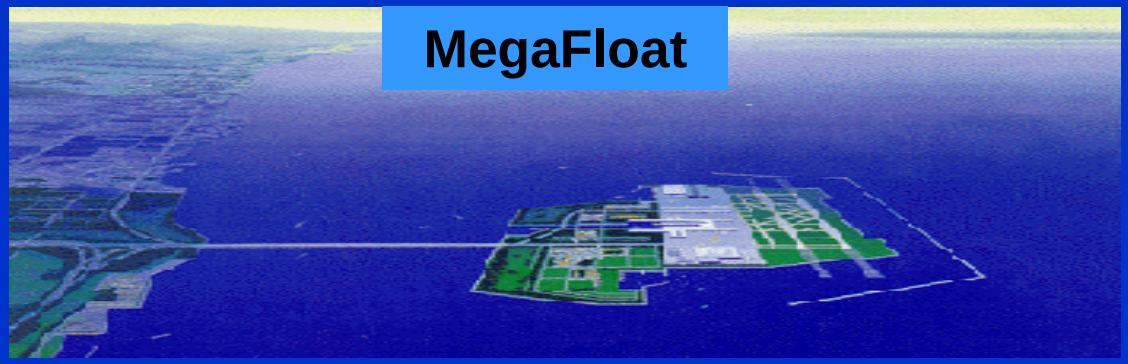
Semisubmersible OTP



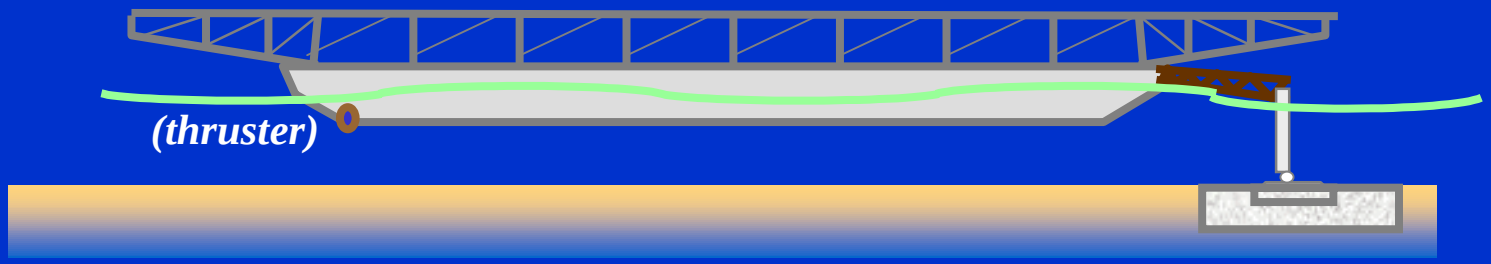
- Water depth > 80-100 feet
- Minimal runway dynamics
- Low mooring loads
- High cost if new construction

Barge OTP

MegaFloat



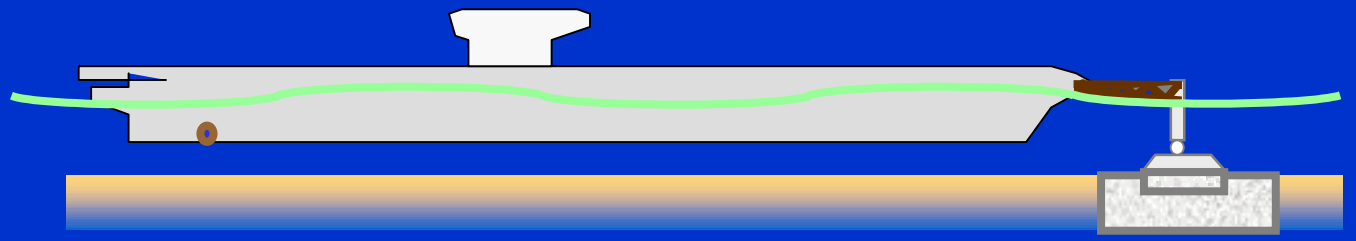
Launch Barge with Elevated Runway



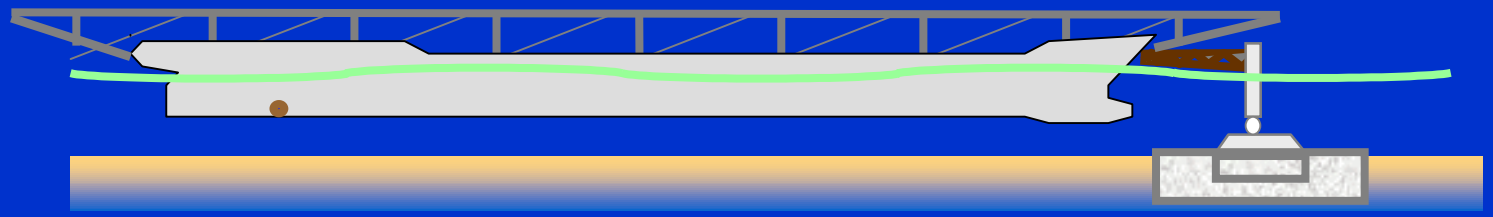
- ***MegaFloat*** **only suited to protected sites**
- ***Launch barge*** **dynamics controlled via ballast**
- **Inexpensive *lay barge* hull (700-850 ft long); limited availability**

Ship Hull OTP

Mothballed CV



Single-hull Tanker with elevated runway



- ***CV:*** **- Low acquisition, high modification and life cycle costs**
  - Limited runway length - low Ao (runway dynamics)
- ***Tanker hull:***
  - Low acquisition and modification costs; Multiple hull options
  - Dynamics controlled via ballast; FPSO experience base

Example OTP Technical Issues

Vessel and Runway

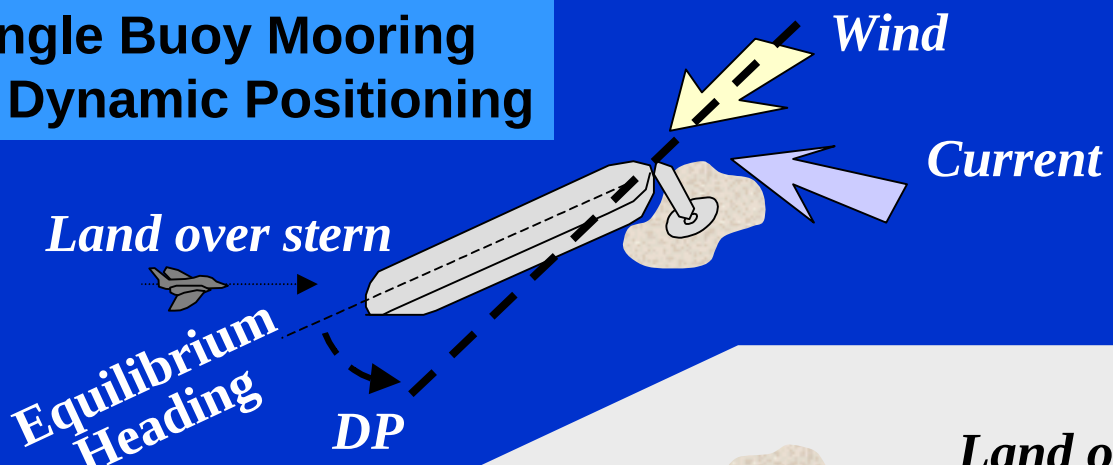
- Dynamic motions in waves
- Survivability/structural integrity (storms & collisions)
- Runway length
- Fatigue life
- Potential bottom impact for deep draft candidates
- On-site inspection and maintenance
- Reliability based design methodology

OTP Stationkeeping Candidates

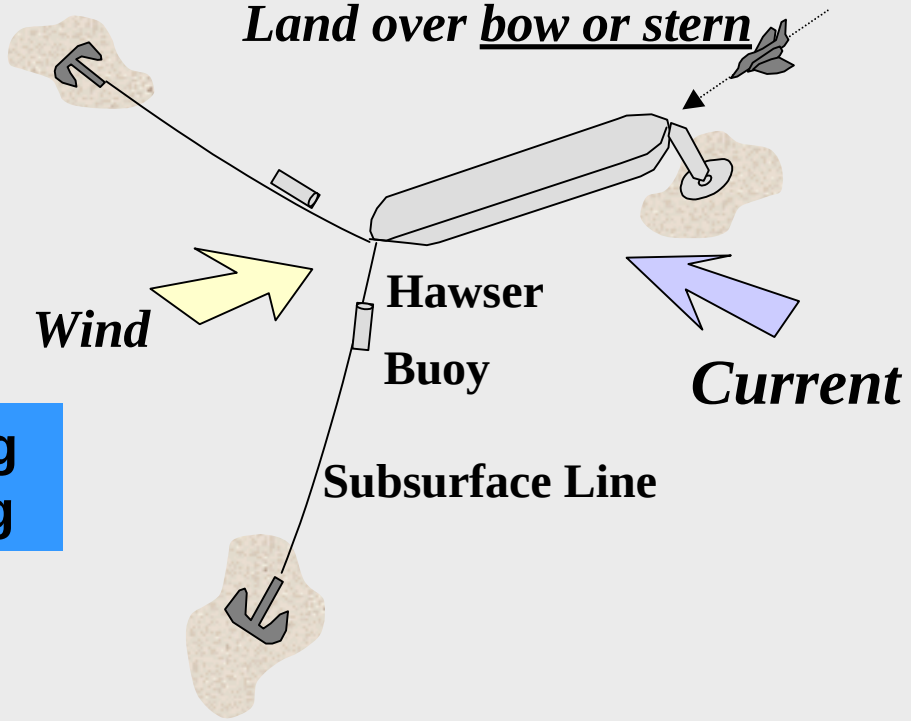
- **Piles**
- **Mooring Dolphin**
- **Single Buoy Mooring (SBM)**
- **SBM with Dynamic Positioning**
- **SBM with bow 2-point mooring**
  - ***Manual control***
  - ***Intelligent controller***

OTP Single Buoy Mooring Candidates

Single Buoy Mooring with Dynamic Positioning



Single Buoy Mooring with 2-point mooring



Example OTP Technical Issues

Stationkeeping

- **Survivability**
- **Fatigue life (hawser/yoke)**
- **Anchoring**
- **Dynamic positioning control/reliability**
- **Connection/Disconnection**
- **Inspection and maintenance**

Example OTP Technical Issues

Outfitting

- **Use of GOTS vs. emulation of GOTS with COTS**
  - ***ILS, LSO platform, FLOLS***
- **Distributed approach control communications**
  - ***Positive link between LSO & Controller***
  - ***Line of sight, antenna design***
  - ***Integration into FAA systems***
- **Autonomous safety systems to reduce req'd manning**
- **Bird nesting/congregating alleviation system**

OTP Program Issues

- **Cost**
  - ***Acquisition***
  - ***Cost of Ownership (Vessel and Stationkeeping)***
    - **Operating Costs**
    - **Overhauls/Repairs**
    - **Indirect Costs (*e.g., complimentary storm mooring*)**
- **Operational Availability**
  - ***Operational Constraints/Flexibility***
  - ***Stationkeeping Performance***
- **Regulatory Compliance**
  - ***Environmental***
  - ***Safety***
  - ***Navigation***
- **Risk**
- **Applicable Technology and Practice**

OTP-Relevant Technology

- **Floating Production Storage and Offloading Facilities (FPSO)**
  - ***Design and construction technologies validated by 30 years experience***
- **Mobile Offshore Base (MOB)**
  - ***Seakeeping models***
  - ***Operational availability model (Ao)***
  - ***Reliability-based design process (*Structural integrity, stability, stationkeeping, environmental specification, constructability)**
  - ***Constructability guidance***
  - ***Components* (DP control, connectors, anchors)**
  - ***Semisubmersible designs***

Offshore Training Platform

Concept
and
Technical Development

Proposed Program

Proposed OTP Program

- **Objective**
  - ***Establish feasible concepts and procurement cost of Offshore Training Platform***
    - **COMNAVAIRLANT MNS- NOV 2000 *(draft)***
- **Two Phases***
  - ***Concept Exploration***
    - **Requirements definition**
    - **Analysis of Alternatives (AoA)**
  - ***Concept Development***
    - **Preliminary design**
    - **Verification tests**
    - **Design integration and documentation**

* **Consistent with DoD 5000.2**

Phase 1: OTP Concept Exploration

1.1 Requirements Definition

1.1.1 CONOPS (operations, logistics, manning, maintenance)

1.1.2 Functional (length, crosswind, motions, Ao)

1.1.3 Metocean & Site (waves, current, wind, seafloor)

1.2 Analysis of Alternatives (AoA)

1.2.1 Identify measures of effectiveness (MOE's)

1.2.2 Define and assess candidate concepts (total ownership cost, survivability, Ao, safety, environmental compliance, risk)

1.2.3 Downselect best candidate system (platform, stationkeeping, outfitting)

Phase 1: OTP Resources

Task	Performer	Cost ($M)
1.1 Requirements Definition ***1.1.1 CONOPS*** ***1.1.2 Functional*** ***1.1.3 Metocean & site specification***		
1.2 Analysis of Alternatives ***1.2.1 Identify MOE's*** ***1.2.2 Define/assess concepts*** ***1.2.3 Downselect***		
Phase 1 Cost		

Phase 2: OTP Concept Development

2.1 Preliminary Designs and Verification Model Tests of Downselected System

- *Vessel/runway seakeeping*
- *Stationkeeping*
  - *Survival mooring loads*
  - *Option: Dynamic Positioning (control/power)*
- *Platform Windfield*
- *Outfitting*

2.2 Design Integration and Documentation

4 module (1:60 scale) MOB hydroelastic tests at NSWC-CD

Phase 2: Resources

Task	Performer	Cost ($M)
2.1 Preliminary Designs and Verification Model Tests *2.1.1 Platform/Stationkeeping* *2.1.2 Platform Windfield* *2.1.3 Outfitting*		
2.2 Design Integration and Documentation		
Phase 2 Cost		

OTP Program Cost

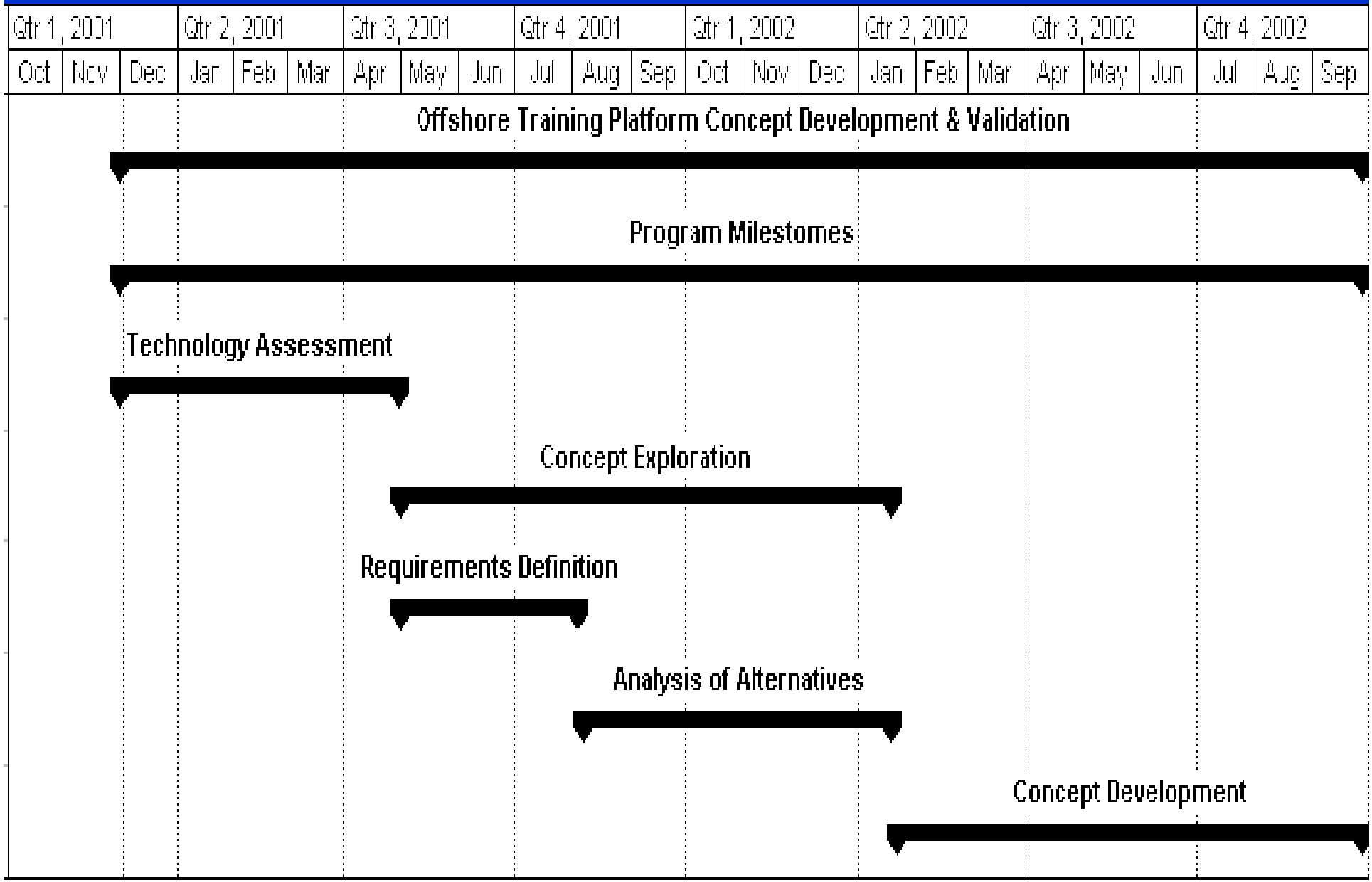
Phase 1	*
Phase 2	* *
Total	

Deliverables	*Time*
Acquisition cost, Life cycle cost, Operational Availability/Downtime	***9 months***
Preliminary Design and Physical Model Tests of Selected System	***8 months***

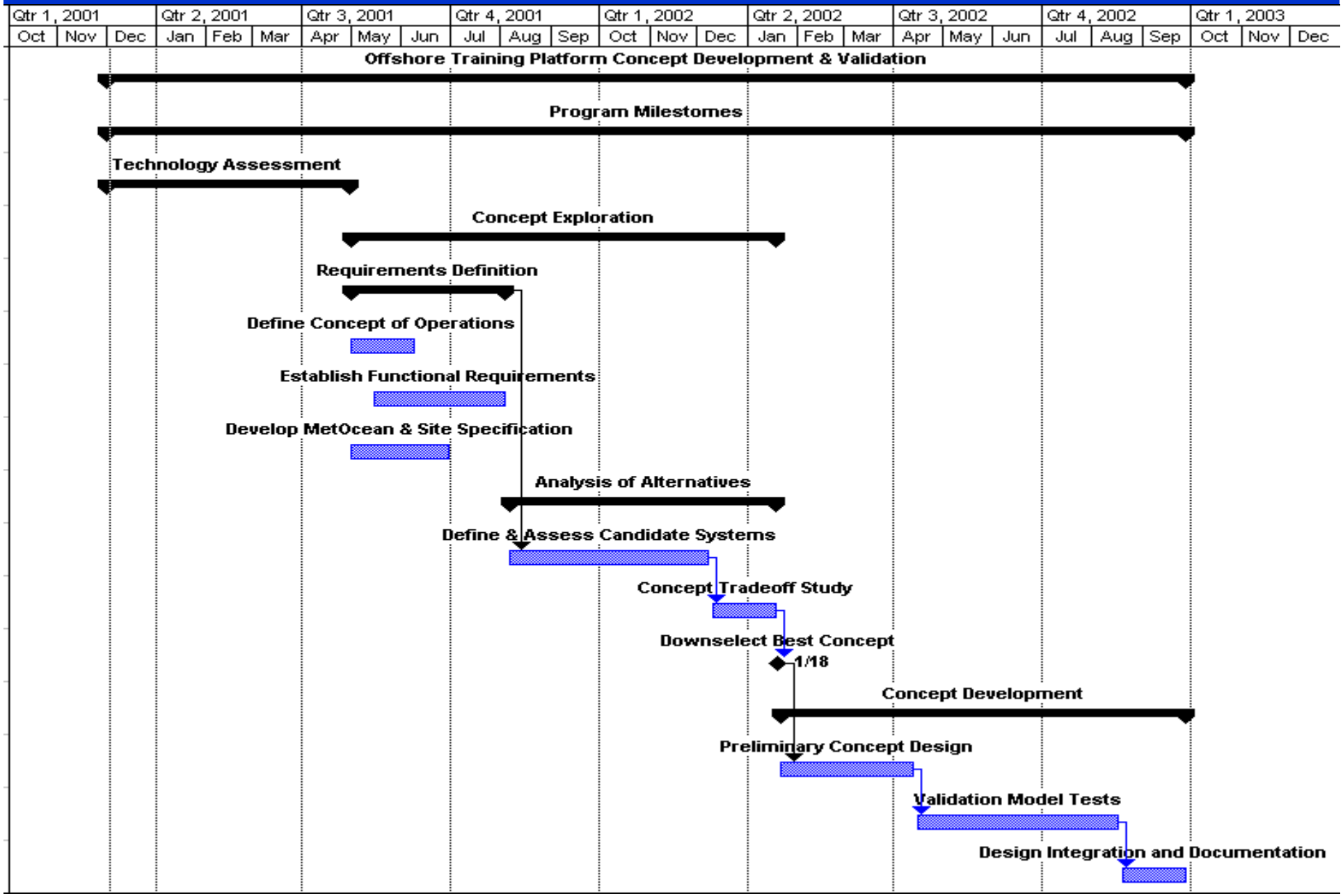
* Requirements definition ($1M) could begin upon completion of Tech Assessment

* * Phase 2 can start immediately upon completion of phase 1 or it can be deferred to the following FY

Offshore Training Platform Program Schedule



OTP Schedule – Major Tasks



Benefits

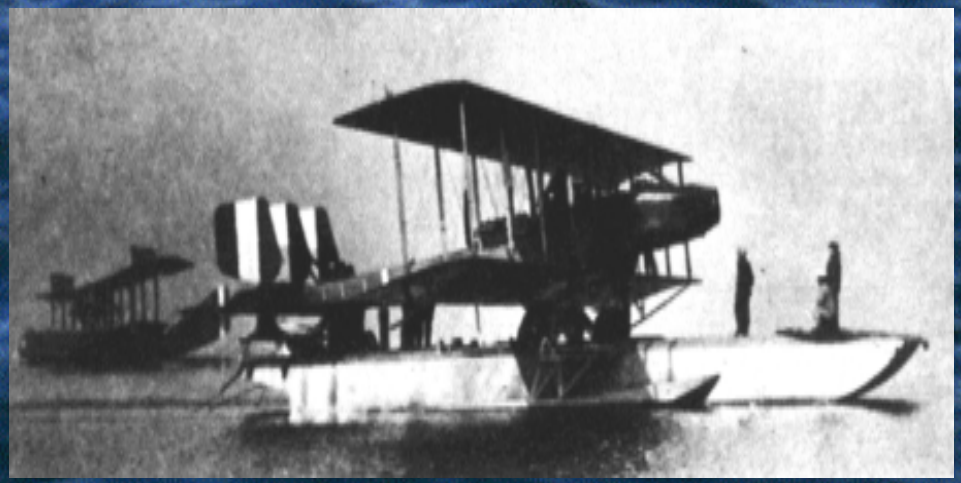
- Concept resolves current deficiency in quality Field Carrier Landing Practice (FCLP)
- Concept partially relieves the local community jet noise issue
- Proposed effort provides a system architecture that is operationally effective and ready for procurement
- Proposed effort improves US offshore capability
- Commercial opportunities could leverage Government R&D dollars
- Concept minimizes environmental impact

Summary

- **Conclusions**
  - ***An Offshore Training Platform is technically feasible***
  - ***A wide range of candidate platform systems and components exist***
  - ***FPSO and MOB technologies can be applied to develop a low risk and operationally effective OTP***
- **Recommendation**

  Proceed immediately with Requirements Definition (Phase 1.1) in FY01

Questions?



Offshore Training Platform
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